

# COST and MANAGEMENT

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COST AND MANAGEMENT

## Cost Accounting in the Rubber Industry

By J. GRAHAM BARROW

*Factory Auditor, Dominion Rubber Company, Ltd., Montreal*

(Before Montreal Chapter, December 6, 1928)

WHEN I first considered the subject of a paper governing cost methods in the rubber industry, I drew up what may be described as a schedule of the various items that enter into the procedure. After giving it some study I found it would be impossible to cover the ground within a reasonable space of time. I, therefore, eliminated a lot of the detail and simply attempted to give a general outline. In condensing a paper you will leave a certain number of gaps in so far as the detail is concerned, but perhaps these can be explained afterwards.

Cost accounting methods in the rubber industry include three separate cost systems. They are: the Job Order System, Process System and the Standard System. All three systems are used throughout the industry according to the class of product that is being manufactured. The industry itself, broadly speaking, is divided into four main divisions: Manufacturers of Rubber Footwear, General Rubber Goods, Automobile Tires and Accessories, and Hard Rubber Products. The general scheme of cost accounting throughout the industry can be described as being uniform. This does not mean that the same kind of forms are used or that the records obtained are identical. Such a system would not be possible as the methods of process vary considerably. It simply means that the methods of cost finding are uniform. To-day the main purpose of cost accounting is to collect information and then present it in such form as to enable the management to conduct the business on a sound, economical basis. In the past when, comparatively speaking, only a few lines of rubber goods were manufactured such as rubber footwear, hose and belting, costs were figured in considerable detail, usually long after the product was manufactured and often after it had been sold. New costs were figured every month. Little attention was paid to past performances and very few records existed that were of real use to the cost man, but as the industry expanded and manufacturing conditions became more complex, modern equipment and the standardization of operations became necessary. The value of proper cost records was recognized and became a necessity to the executives, who constantly require facts on which to base their policies.

To-day rubber products range from the toy balloon to the golf ball, from the tobacco pouch to the elevator belt—weighing several tons. From the fancy footwear worn by Mi-Lady to the hip boot for the fisherman and from the solid tire on the child's scooter to the balloon casing with which we equip the modern automobile bus. As an aid to the control of factory operating costs individual size costs have become too cumbersome, and they are also too general in their

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analysis. When costs are figured in detail they are, as a rule, much too late to be of any real use to the management in so far as selling is concerned. Nowadays rubber products are sold months in advance of the actual date of manufacture, and it is absolutely necessary to have sufficient knowledge of costs in order to fix the selling price. It has, therefore, been necessary to design a system of cost accounting that will provide a more prompt and accurate check on operating conditions, and in addition provide a medium by which future operations or costs can be judged.

### Standard Costs

Standard costs have been regarded as the best means of coping with present day requirements. Standard costs have been defined so often that all I need say here is that they do not supplant actual costs but supplement them, providing a comparison which is of considerable help in the improvement of factory control. Factory costs are made up from five elements:—

Direct Labour  
Direct Materials  
Indirect Labour  
Indirect Materials  
Indirect Expenses

Direct labour includes the cost of all labour which is definitely applicable to operations pertaining to the conversion of raw materials into finished products.

Direct materials include all raw materials that are used in the production of rubber goods and do actually become in some shape or form a part of the finished product or else definitely attached to it. For example, cartons used as containers for footwear and lead tubes used as containers for cement are considered direct materials.

Indirect labour includes the cost of all labour which contributes indirectly to the production of finished goods, such as Executive Supervision, Superintendents, Foremen, Office Help, Maintenance Men, etc.

Indirect materials include the cost of all materials necessary for the operation of the plant but which cannot be applied directly to and do not become a part of the finished product, such as coal, power, oil, moulds, patterns, etc.

Indirect expenses include such items as depreciation, taxes, telephone and telegraph expense.

At this point a brief description of what is probably the most important department in a rubber factory, the mill room, may be helpful. The machinery and equipment and the general method of process is, practically speaking, identical in all rubber factories regardless of whether they are manufacturing, footwear, tires or general rubber goods.

### Raw Materials and the Mill Room

Rubber is a vegetable compound, the hardened juice of a tree. Before it can be used in the production of rubber goods it must, with comparatively few exceptions, be mixed with chemicals. Sulphur acts as a vulcanizing agent. Some chemicals toughen and improve the

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wearing qualities, whilst others are used to produce colours and shades of all descriptions. Fully 90% of the raw materials used in a rubber factory are delivered to the mill room, where they are processed and prepared according to factory requirements, and then distributed to the various departments. The mill room is, therefore, from the cost accountant's point of view, of particular importance. It is here that the control of raw materials and also a substantial amount of the direct labour and factory overhead is established. The control of materials processed is kept on a series of records which describe in detail the stock that is processed and also the various ingredients that are required to make up each stock.

As the different stages of preparing the stock are completed the information is posted to the control record. The mill room reports show the class of stock that have been processed and the department to which it has been delivered. Another record gives the amount of labour that it has taken for each of the operations necessary in the process. As the time taken to prepare the different stocks vary, the actual labour cost is applied directly to each specific stock produced. At the end of the month these records are totalled, material prices are added, the extensions made and the cost completed by adding the labour and also the indirect expenses or overhead incurred by the department.

### Process Costs in Footwear Manufacturing

The next step is to ascertain the total quantities that have been delivered from the mill room to the manufacturing departments and transfer the costs. In making this transfer, costs for material, labour and overhead are shown separately. In footwear factories the process method of cost finding can be, and is, employed advantageously. The identity of the individual order is lost entirely as the process of manufacturing is continued for a regular period of time, therefore, the necessity of interdepartmental charges is eliminated in so far as footwear is concerned. Materials, with the exception of that portion which passes through the mill room, are charged to a definite process. The labour and overhead costs are also charged to definite processes, and after the total production is obtained the unit cost is found. When we say we obtain the unit cost of rubber footwear produced it is not meant that we know the actual cost of each unit or pair of shoes manufactured. A system that would give such a result as this would incur expenditures out of all proportion to the results obtained. What we really do is: For each line of footwear manufactured we make up a standard or an ideal cost. The labour in this cost is based upon actual working conditions in the various departments. The time taken to perform each operation has been carefully checked up and allowance is made for various possible delays. Actual piece-work rates are used where possible and an equivalent base rate is used for operations which are performed by day work. The materials are taken from the standard specifications, which are also the result of careful study. The specifications are not made up until after the various parts have been collected together and weighed individually and in bulk and standard average weights obtained. The overhead is averaged on the basis of past performances, at the same time taking into consideration various

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factors that may have a future bearing on factory expenses. In other words, we make up a cost which we believe is as accurate as it is possible to get a cost.

Each month the production is recorded by lines of shoes manufactured. Each particular line is priced at its respective standard cost, which is multiplied by the number of shoes produced. These values are then added and the total sum arrived at is compared with the cost of production as obtained from payroll labour, material consumption and also factory expense records. The material consumption represents the difference between the value of the previous month's inventory of goods in process, plus the value of goods delivered to the mill for the month, less the value of goods process inventory at the end of the month. In footwear factories there is, practically speaking, no goods left in process in any of the departments with the exception of the mill room, with the result that the monthly inventory can be quickly taken and at the minimum cost. The cost of production statement is drawn up to show all the main divisions of labour and material. The total value consumed against each item is shown, the percentage of efficiency is compared and the standard cost is ascertained. Factory expenses are shown in separate totals for the two main sub-divisions, labour and other expenses. By considering standard value of production as 100% we are able to determine the variation that has taken place in actual cost. If, for example, this variation amounted to 1%, we would merely assume that each unit cost us 1% more than the standard value, or if some special condition had existed that was known to the management it would be possible to apply the resulting expense against that part of the product directly connected with it. It will be seen from the foregoing that whilst the standard costs cannot be absolutely proven in individual cases, the result of the comparison after taking known factors into consideration, enables us to say, with a reasonable amount of certainty, that our actual costs approximate the standard cost to within a definite established percentage. In the manufacture of general rubber goods products we have a somewhat different problem in so far as the cost accountant is concerned. There is probably a greater variety of articles produced in general rubber goods factories than in all branches of the rubber industry put together.

### Separate Branches

Each department in the factory constitutes a separate factory to itself. There is no similarity between a hot water bottle and a length of fire hose or between a rubber heel and conveyor belt. They are made in different departments and by entirely different processes. Each department makes out its own production report. The system of cost finding is based on the job order method. This does not mean that the labour and material is recorded against the individual order. What we actually do is arrange the commodities in groups. For example, there are certain classes of product which can be grouped regardless of size and an average pound price obtained which is quite satisfactory in so far as material costs are concerned. In other groups it is necessary to base the costs from average weights, we then have "specials," that is, articles that are not standard

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in any way. These have to be costed by means of the job order system. For merchandise that can be costed under the group system standard costs are used. The standard unit usually being price per pound as production is recorded in this manner. If it is hose or belting the pounds produced are multiplied by the standard unit and the result divided by the number of feet, which is the selling unit. The monthly costs per unit can then be checked against previous costs and the variations noted. The total production is priced from standard and actual costs and any difference that may exist between actual consumption as shown by physical inventory of goods in process are taken care of when the inventory is taken.

### Tires and Accessories

In factories manufacturing automobile tires and accessories the cost finding is based primarily on the process system, but it does not operate in precisely the same manner as in footwear factories. The production costs in a tire factory are a series of estimates, which, when consolidated, form the basis of a complete standard cost. The system differs from the straight process method inasmuch as a definite control is kept on the costs by sizes throughout the whole course of manufacture. Tires are not produced in as great a unit volume as most other rubber commodities, but individually they represent a much bigger unit and are, therefore, more easily controlled from the cost man's standpoint. The variety of articles produced is not as great as in the other branches of the industry. Individual parts of the product are, with few exceptions, greater in size and easier to trace, whilst the method of manufacture is such that the material flows through the departments in a manner very similar to its distant relation—the rubber shoe. As the materials leave the mill room they are charged to the respective departments throughout the factory. In the departmental ledgers the charges are bulked, but the subsidiary records are posted in detail and according to classification of stock. All goods produced are manufactured in accordance with standard material specifications, a copy of each specification is supplied to the Cost Department and is transferred to what is called a control card. This card shows the material required to build a tire and is drawn up in such a manner as to give the information by department. Thus the cost clerk can definitely trace the consumption of material at practically any stage of the process. At the end of the month the production reports are summarized and the material consumption for each size or group of tires or tubes produced ascertained by multiplying the quantity produced by the value of material recorded on control cards. The direct or productive labour is next applied and cost of production is completed by adding the factory overhead. A physical inventory of goods in process is taken periodically and difference between actual and estimated costs are adjusted in the accounting records.

### Distribution of Labour

So far I have said very little regarding the distribution of labour. An effort is made wherever possible to schedule the work to the individual operation. Where this can be done a work slip is made

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out in advance, its shows the operator's number, the department, the particular part the operator is making and also the operation. After the work is completed the slips are returned to the time office, where the rate is inserted and the amount earned is computed and posted to the payroll records. The work slips are then sent to the Labour Distribution Department.

The distribution of labour is scheduled by department and operation for both productive and non-productive labour, the total of which must balance with accrued payroll on the timekeeper's records. In clearing accrued payroll for the month, the distribution between productive and non-productive is utilized for the purpose of charging labour to its proper accounts. Productive labour is charged to Labour in Process and non-productive as its sub-division of factory expense labour. One of the basic numbers of cost accounting is to include under direct labour all the labour which it is legitimately possible to charge directly to the product, thereby curtailing the amount of indirect labour to be distributed. Thus we have a departmental comparison operation by operation from week to week or month to month as the case may be.

### Distribution of Overhead

Distribution of overhead is made direct to the departments where possible. In this manner the ever present question of how shall we distribute factory expense to the various departments is to a great extent simplified, as the proportion of expenses that have to be spread represents a comparatively small part of the whole. For purposes of comparison and also as an aid to factory operating control expenses are classified in accordance to the nature of the expenditure. Standard subdivisions of accounts are provided for expense labour, expense materials and other expenses. The general scheme of factory accounting is based on the control system. Each control is sub-divided into as many sub-divisions as are necessary and subsidiary ledgers are arranged so as to conform with the general ledger.

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## THE NEW CALENDAR

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**M**OSES B. COTSWORTH, who is to a large extent responsible for the 13-period calendar, which was described in the address of Meredith N. Stiles, printed in May "Cost and Management," recently returned to Canada from Europe. He has been interviewing government departments and business organizations on this side, and is confident that the new calendar will be approved. Mr. Cotsworth was a recent visitor at our society's offices in Toronto.

## COST AND MANAGEMENT

# Accounting Control in the Rubber Industry

By H. P. NELLIS

*Assistant Treasurer, Dominion Rubber Company, Limited,  
Montreal*

(Before Montreal Chapter, January 24, 1929)

IT might be interesting to draw to your attention that the year 1929 is the seventy-fifth anniversary of the Rubber manufacturing industry in Canada. The first rubber goods factory was established in Montreal in the year 1854, and from that small start has grown the present large industry. To-day its investments in plant, equipment, sales, both domestic and export, are written in millions. Goods now manufactured comprise rubber footwear of all descriptions, druggist sundries, belting, hose, packing, plumbers' supplies, heels and soles, automobile tires and tubes and accessories.

It is, therefore, essential that, in an industry of such proportions, and in which one company might control numerous sales branches and factories, to have an efficient and uniform accounting system in all its phases, in order that financial statements, reports, etc., can be released to the executive of the company in the least possible elapsed time, as the big requirement in the modern day, and of strong competition, is, "Current Information and not History."

To cover completely in detail the accounting procedure in this industry would take up a great deal of time, therefore in preparing this paper, I have endeavoured to give a general outline of the system used.

For purposes of explanation have divided this paper into six sections as follows:—

1. Chart of Accounts.
2. Accounts Payable System.
3. Sales Division Accounting.
4. Factory Accounting.
5. Head Office and General Accounting.
6. Budgets.

### No. 1—Chart of Accounts

In the accounting end of the rubber industry is used a classification of accounts designed as a standard uniform plan for the titles and arrangement of general ledger accounts, of all accounting units of the company.

The basis of the plan is a decimal classification system, with ten main groups or classes, designated by the numbers 1 to 0, the numbers and group titles being indicative of the manner and the order in which assets, liabilities, etc., properly should be stated in a fully condensed balance sheet.

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The ten main groups or classes are as follows:—

### Assets

1. Cash and Debts Receivable.
2. Finished Goods, Goods in Process, Materials and Supplies.
3. Prepaid, Deferred and Miscellaneous Assets.
4. Properties and Plants.
5. Securities, Goodwill, Patents and Trade Marks.

### Liabilities

6. Current Liabilities.
7. Fixed Liabilities, Capital Stock and Surplus.

### Income

8. Income and Expenses on Sales.
9. Other Income and Expenses.

### Clearing Accounts

0. Operating and Clearing Account.

Each of these general classes is divided 11 to 19; 21 to 29, etc.; the accounts in each class being those comprised in the customary monthly balance sheets and statements of earnings. These classifications represent, as the conditions in each case may determine, either general ledger accounts, or the combination of definite groups of accounts, which for the purpose of convenience, or for more detailed information, are kept separately in the general ledger. As many accounts as are customary or necessary may be opened under each of these classifications with decimals affixed to the standard numbers, that is:—13.1—13.2, etc.; so that the balances of the various accounts under each classification may be readily combined in preparing the trial balance and balance sheet. To keep the system uniform, however, at all units, new accounts can only be opened upon the approval of the official of the company in charge of accounting.

In cases where the balance of an account is to be added to its general classification in preparing the trial balance it is sub-numbered .1, .2, etc., and where the balance of an account is to be deducted it is sub-numbered .01, .02, etc.

For example, the control of accounts receivable customers would be numbered 1.12 and which would be sub-divided to:—

- 1.12.1 Customers' Accounts.
- 1.12.01 Reserve for Bonus.
- 1.12.02 Reserve for Bad Debts.

The accounts in the general ledger of each selling division, factory and the head office are arranged in numerical order, the account number always constituting part of the account title. The balances then automatically group themselves on the trial balance, and by use of four columns the balance of each account is entered "in short" and the totals extended as required for the balance sheet.

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There are two voucher forms used in connection with the foregoing system; one is known as a subsidiary to voucher form, and the other a journal voucher form.

The subsidiary voucher is used to voucher one or more entries as they occur, or are required; as these subsidiary forms accumulate they are recapped on to the journal voucher in detail and by controls, the details are posted direct to the general ledger, and the totals of the controls are posted in the voucher record book, and when that book is closed off for the month the totals of each control are posted to their respective control accounts in the general ledger.

These voucher forms have spaces provided for account number, title of account and amount; the subsidiary form has an extra space provided for reason of entry.

This control system of accounts facilitates greatly the balancing of the general ledger, as it can be carried out by controls, so that should a discrepancy occur it is only necessary to check the postings in the controls that are out of balance, as against checking all items from the beginning in a ledger where the control system is not used.

### No. 2—Accounts Payable System

All accounts payable, including those of factories, sales divisions and head office, are paid by cheque, through the accounts payable department, head office. Under this method where a company has numerous branches and factories, the vendor receives only one cheque instead of probably a half dozen or more were each unit paying their own accounts, besides the advantage of having the work centralized there is the saving in postage, excise stamps and stationery. The general outline of the system is as follows:—

The invoices from the vendors, as they are received by the various units, are first checked as to receipt of goods, prices, terms, extensions, etc., and are then approved for payment. They are then listed on what is known as an "Accounts Payable Register Sheet." Each invoice is given an accounts payable number, according to the month in which it was passed for payment, and separate columns are provided on the register sheet, whereby the amount is shown under the month in which the invoice falls due. For example, those passed in January would be numbered commencing with 10,000, February 20,000, and so on to December, which would be numbered 120,000; thus the first accounts payable invoice for January at any one unit would be 10,001, and the number having a pre-arranged letter prefixed to denote the name of the unit.

These register sheets, together with the invoices, are forwarded daily to the Accounts Payable Department, Head Office, where the invoices are checked against the register sheets, and then filed according to due date, and alphabetically, as each due date arrives the invoices are taken from the files and sorted according to vendors and the cheques issued.

The cheque used is what is known as a voucher cheque, on the voucher portion of which is typed the dates and amounts of the invoices, also the accounts payable number. The amounts are then

## ACCOUNTING CONTROL IN THE RUBBER INDUSTRY

totalled, cash discount deducted and the cheque portion typed for the net amount.

The invoices are then marked off on the accounts payable register sheet by date stamp as paid, sorted according to factories and sales divisions, and returned to their respective units for filing purposes.

The total of all open items on the register sheets at the close of any month must agree with the control account in the general ledger.

### No. 3—Sales Division Accounting

In a large organization the selling end of the business is generally divided into what are known as sales districts or divisions, and each division being composed of two or more branches, of which the main branch is known as the division office.

At the sub-branches no general accounting is carried out, the only accounting being the stock and sales record for that branch and a small imprest cash fund. No sales ledgers are kept at the sub-branches; copies of all sales invoices issued are sent to the division office for sales ledger posting and collection. As the imprest cash fund is used up the expenditures made are listed on a form provided for that purpose and forwarded to the division office, where a cheque is issued for the reimbursement of the sub-branch cash fund.

As to the division offices, accounting work should be kept as far as possible to a minimum, leaving the division office more time for sales, credits and merchandising.

It is, therefore, an advantage to have the work of the sales divisions' general ledgers centralized at the head office of the company, where more facilities are available for the carrying out of the work. The accounting left to the division is thus sales ledgers, general cash book, trust cash book, stock and sales record, and collection of accounts.

The stock and sales record is a card system on which the receipts and shipments of merchandise are recorded by item and units, and is under the control of the merchandise manager, who is responsible for the standing of the stock.

The division offices operate on a trust fund, the necessary cash for same being supplied by head office through a semi-monthly request for cash form. As all accounts payable are paid by head office, the requirements for cash only cover salaries and wages, freight and express and small local items.

All remittances from customers are deposited in a special account and cannot be drawn upon by the divisions, but is transferred to head office as it accumulates.

As to credits, the credit man of each division is responsible for all credits in his division, with the exception of those amounting to \$5,000.00 and over, which must be referred to the treasurer for approval.

A complete accounting control is maintained in the treasurer's department, head office, of all insolvent accounts.

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### No. 4—Factory Accounting

A general ledger is maintained at each factory, in which the main items controlled are raw materials and factory expenses.

The general ledger is lined up according to the chart of accounts. All subsidiary records are arranged to conform to the control account in the general ledger. At the close of each month the subsidiary records are balanced with the general ledger and a complete balance sheet made up and forwarded to the general accounting department, head office, to be included in the consolidated balance sheet and statement of earnings.

The factories also operate on a trust fund, the necessary cash for same being supplied weekly by head office through a weekly cash requirement form, the requirements for cash covering wages, freight and express.

Practically 90% of factory accounting is in connection with cost work, details of which have been previously explained in a paper recently submitted to this chapter.

### No. 5—Head Office and General Accounting

The head office accounting department is what might be called the "heart" of the accounting system, as it is from this department that all rulings and instructions are issued in reference to accounting.

Under this department in a section by itself is the division general ledgers department, whose duties are the preparing of and posting entries to the division general ledgers, there being an entirely separate ledger for each division. The entries for the ledgers are prepared from the approved items sent in by the divisions, and also the recapitulations of the general cash and trust cash books and accounts payable register sheets. After the ledgers have been posted and balanced, a balance sheet and earning statement is drawn off for each division and turned over to the general accounting department to be included in the consolidated balance sheet of the company.

The head office accounting department proper have their own general ledger, which is the ledger of the parent company, and entirely separate of the selling divisions and factories. This ledger is posted from the necessary vouchers prepared by the general accountant, the head office general cash book and accounts payable register; a balance sheet and earning statement is then prepared.

The next step is the compilation of the consolidated balance sheet and statement of earnings. The balance sheets received from the divisions, factories and head office are listed on what is practically a large balance sheet with a column provided for each subsidiary. These columns are then cross added and extended into the total column, and from that column is drawn off the consolidated balance sheet and statement of earnings.

Inter subsidiary accounts receivable and payable are of course automatically eliminated.

The main items controlled in the division general ledgers are accounts receivable customers, sales and selling expenses. In the

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head office general ledger are controlled cost of finished goods inventories and head office selling and administration expenses and cost of sales.

Stocks of finished goods at all units are controlled by the head office merchandise department with the assistance of a merchandise manager at each division. All orders from the selling divisions are forwarded to this department, where a complete record is kept of the standing of orders on factories and finished goods on hand. It is the responsibility of this department to see that proper stocks are kept, and that no more goods than necessary are made to avoid obsolescence.

As to commitments, the purchases of all units are centralized through the general purchasing department. Requisitions for requirements are all forwarded to this department.

The purchase order used is lined up so that a statement of the companies' commitments, both completed and uncompleted, can be readily obtained. The general purchasing department is responsible for the standing of all stocks of raw materials.

The control of plant accounting is also centralized at head office.

All requirements for buildings, equipment, etc., and repairs must first be requisitioned for on an appropriation form, giving full details of the item and estimated expenditure. No expenditure can be made until the appropriation has been approved by the executive.

A complete record is maintained by appraisal and card record, from which can be obtained figures by buildings, floor, departments, etc., or by individual machines.

### No. 6—Budgets

Accounting budgets might be divided into two classes:—

1. The Complete Budget.
2. The Treasurer's Budget.

**The Complete Budget** is compiled quarterly or semi-annually by months (and may even be revised as the occasion arises). This budget comprises a complete balance sheet and earning statement as they are expected to appear upon future dates.

The Budget starts with the last known actual position of the company.

The various units are then called upon to supply their estimates by months for the period required factories for production. Sales divisions for sales and selling expenses, head office departments for their expenses and expected standing of certain asset and liability accounts, others being obtained in the compilation of the Budget figures.

This information is all turned over to the official in charge of budgeting, and from it is turned out the complete Budget which give the executive a complete view of the expected position of the company for the period covered by the Budget.

**The Treasurer's Budget**—We will give it that title as primarily it reflects to the treasurer the expected receipts and expenditures. This Budget is compiled from figures supplied by the various units. It

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is compiled monthly, and gives the figures in a condensed form by months for the immediately following four months, thus the figures issued in January would cover February, March, April and May. The last three months would be reversed again in February, as its figures would cover March, April, May and June.

This Budget also gives the general sales department a view of the expected sales and expenses.

In conclusion, I might state that the actual detail work of accounting in the rubber industry is practically the same as in any other industry, and I, therefore, have endeavoured to bring out to your attention in a general way the control system used and other items that are peculiar to this industry.

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## MASS PRODUCTION

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"**M**ASS production is the one god and the efficiency expert is his prophet," was the statement made by Prof. E. A. Alcut, M.Sc., M.E.I.C., associate professor of mechanical engineering at the University of Toronto, addressing the Board of Trade Club, Toronto, recently on "The Dangers of Mass Production."

Declaring that he was fully aware of the advantages of mass production, Prof. Alcut said that these very advantages had been exploited and over-emphasized, and that they produced the following inevitable drawbacks:

- (a) Aggregation, or increase of size of organization, because the buyer tends to dominate or absorb the supplier.
- (b) Specialization, that is, confinement of activity to limited field for the production of limited types.
- (c) Standardization or further limitation of sizes to suit average demand; shoes and clothes, for example.
- (d) Extreme division of labour, as shown in the specialization of men.

"The consequences of these on the debit side," continued the speaker, "may be classed under two headings—material and human element. The quality of a product tends to suffer by mass production, and this is not improved by the constant desire to speed up production."

The human element is an important factor in mass production. The men become cogs in a huge machine. There is a loss of personality and initiative. The skill of a man is transferred to a machine and his craftsmanship is lost.

"An industrial system which subdivides the manufacturing process until the individual worker is only a part of the machine and which then denies him participation in the management, must of necessity leave him with little, if any, interest in the business."

The speaker remarked that some aspects of mass production, its specialization especially, have affected sport and that baseball and hockey are striking examples of its commercialization and the specialization of the players for particular positions.

## CONTROL OF MATERIALS

# Control of Materials

By T. L. McNAMARA, A.F.I.A., F.C.A.A., Etc.

(Before the Victorian Branch of the Australian Institute of Cost Accountants)

(From "The Accountants' Journal")

**T**HREE are few manufacturing concerns at the present time in which the matter of materials control is not one of the major problems. Other problems may exceed it in importance in many cases, but it will still rank among the more important questions with which the cost executives have to deal. It is obviously impossible for a company to manufacture tangible goods without using materials of some kind and quantity in their fabrication.

For every manufacturing concern, no matter what may be its product, size, age, type of organization or personnel, certain fundamental problems exist. One of them is that which concerns material and its control, and this involves the question of purchasing, receiving, storing, issuing, valuing, inventorying and recording in costs, points upon which I am to say a few words this evening.

### Purchasing

In purchasing—quality, service and price are the three factors.

Quality is defined by the specification and maintained by rigid inspection. Better material than the specification calls for is unnecessary and uneconomical—lower grade material should not be purchased.

Service is nearly as important as quality and must always be secured. Material must be on hand when wanted—not ahead of schedule, which would increase capital investment charges—not behind schedule, which might cause expensive delay.

Price must not exceed the value of similar standard articles, or the price paid by competitors for the same thing.

The value of an article is not necessarily shown in the price. The saving possible through competitive bids and purchase on judgment as to price and quality alone is often relatively small when compared with the economy possible by the joint consideration of price, quality and utility of the articles purchased. The real cost of an article is the price of that article divided by the service it will render.

The modern purchasing executive is an economist who studies his markets, price trends, raw materials and the sources of supplies. He must be well grounded in the principles of economics, especially regarding value, utility, price and cost.

In every factory more raw materials are bought than are actually put into production; some portion of this shrinkage is necessary, but usually it can be reduced if investigated and better methods used.

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Some of the common causes of shrinkage which will yield to treatment are:—

1. Incorrect selection.
2. Materials received not up to sample or specification.
3. Materials received damaged or short in amount.
4. Injuries and losses by handling.
5. Deterioration losses.
6. Incorrect amounts issued to production.

### Incorrect Selection, Etc.

1.—The materials purchased should be approved or selected by an expert on the basis of adaptability to the purpose required. An essential of a good product is proper raw materials. Use the best knowledge available to select correct materials and avoid losses of rejections, process troubles and a product not up to standard.

2 and 3.—An expert should check materials when received to make certain they are the same as selected. His rejection of a shipment should be final. The receiving clerk should examine carefully for damage and check for shortages. This is often neglected or not thoroughly done on large raw material shipments.

4.—Prevent injury and losses in handling materials by promptly transferring to stock in suitable containers and with protection. Use good judgment in selecting a storage location adapted to the material.

5.—Deterioration will be minimised by orderly storage with provision for suitable conditions of temperature, light, moisture and arrangement. See that requisitions are filled from stock which has been on hand the longest.

6.—Excess materials sent to production seldom come back to stock, so every effort should be made to issue the right amount to avoid excess material and the delays, spoilage and waste caused by shortages.

In purchasing the following points should be considered:—

1. Demand for the article.
2. Saving by purchasing in quantity.
3. Amount of money tied up in stock.
4. Time required to get and use.
5. Possibility of change in the design depreciating the value of the article.
6. Requisitions to be approved by some responsible head before being sent to the purchasing department.
7. Purchasing department to maintain an up-to-date list of quotes received and prices paid for materials.
8. No order to be placed unless previous price referred to.
9. Invoices not to be sent to works; receiving reports from departments should be checked against invoices.
10. Shippers and suppliers to quote Order No. on all consignments or deliveries.
11. Purchasing department to look after all material ordered, keep record of shortages, spoiled and defective goods received, and arrange for their credit or return.

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### Receiving and Storing

No material of any description should be received unless accompanied by a firm's delivery ticket, giving a description of the goods and quoting thereon the order number. All receipts should be carefully checked as to quantity and weight, and if large quantities (e.g., metals, coal, etc.) should be put over a weighbridge and a certified weighbill furnished. A record should be kept of all goods received. All goods theoretically come "into store"—that is, into the custody of the storeman—though actually goods such as sand, screenings, etc., are kept elsewhere than in store. If new machinery is bought it must go into store (at least by way of record) and held there until a properly signed requisition is furnished for same. The record, which should be made by the person receiving the goods, should show date received, item number, supplier, order number, particulars of goods, quantity or weight. This form should be sent to the store and the office should depend upon the daily stores received list. Storemen are very apt to become careless in the checking of goods received when they know that the invoices for same will be sent to them to check.

**Storing.**—For economical storing one should provide for:—

1. Location of stored materials, to prevent undue damage, pilferage, and prevention of loss by fire—e.g., lubricants should be kept in a place free from dust and dirt, not subject to extremes of heat or cold. These materials are often expensive, and their waste and spoilage must be prevented.
2. Location to minimize handling and transportation.
3. Avoidance of overloading floors and consequent damage to building.
4. Arrangement of materials for utility of space and ease of removal. Dead or inactive storage should be located so as to cause minimum interference with active stock.
5. Use of suitable equipment for storing and protecting materials.
6. Use of labour-saving equipment for handling, counting and weighing materials. Equipment of this kind is of value in proportion to its use.
7. Provision for flexible use of storage areas for different classes of materials as stocks vary.
8. A simple and effective system of storage records and procedure.

A system of reference numbers and letters on the theatre plan should be in use.

Storerooms should be kept tidy, and as few persons as possible allowed access to the store. All goods received should be brought in at a special door, and, if possible, distinct from where delivery is made.

9. A determination of the rate of turnover of each item of stores.
10. Small parts should be kept in bins, drawers, boxes.
  - Oils in barrels, or G.I. containers.
  - Piping, steel, etc., in iron racks.

Where possible, all shelving should be of the steel variety—in sections that could easily be increased.

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Summed up, there should be a place for everything and everything in its place.

One of the most important functions of a stores department is to provide for a constant flow of work through the factory at a time when without it there would be a lack of materials. It should be the aim of the management to control production in such a way as to reduce the amount necessary to invest in an inventory without handicapping the operations of the factory because of lack of materials.

### Issuing

The fundamental axiom is that no goods of any description should be issued except on the written request of some duly authorized person. Every stores requisition should be numbered, dated, and contain particulars of the article, required quantity, the job or order number, and provision for values, etc. This order is signed by the foreman, or some other responsible person, a carbon copy being retained by the person signing, and when delivery is made of the article, should be signed by the person receiving the goods and by the storeman who issued same. This should subsequently be forwarded to office for record purposes.

All storemen, or persons charged with the custody of materials, should be furnished by the manager or accountant with an official list of persons authorized to sign requisitions on the store and this list—altered only on the written authority of the manager, etc.—should be rigidly adhered to.

Issues for material, particularly for manufacture, should be made as far as possible "over the counter," and no person other than the storeman allowed on the "store" side of the counter.

Stores which have been in stock the longest should be the first issued. Officials entrusted with the pricing of goods used in manufacture should exhaust stocks at old prices before starting on the recent prices. All stock rates should be adjusted yearly or half-yearly, so that such rates shall not exceed the market price current at the time of valuation, and afterwards rates used will be the net purchase or cost price.

Miscellaneous supplies, as the material and small equipment in frequent use in a manufacturing plant are called (e.g., waste, soap, etc.), are not purchased for a definite use. The tendency then is to use them freely and go back for more, particularly if not under charge of a responsible officer. Often these supplies are stolen or carried away from the works. It is well to consider:—

1. By whom and for what purposes supplies are used. Are they used economically and entirely?
2. A system of rationing out supplies where practicable.
3. The issue of stores with discretion.
4. That the old piece of equipment be turned in when the replacement is issued.
5. That every article issued is for a specified job or process.
6. That all books issued to persons to obtain stores be numbered, and a record kept of same.

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### Valuing

It is desirable to note the two principal divisions into which material is commonly divided—"stores" and "worked material."

Stores include all materials purchased from outside concerns and issued by the store for use in the same condition in which they were received, except for such minor changes as unpacking, cutting off, etc.

Worked material is the name given those materials, parts, sub-assemblies, etc., which are made in the factory, and are then stored until they are needed in the fabrication of merchandise. Another reason for this differentiation is the aid it gives in maintaining the cost accounting records.

The cost price of stores is, of course, the purchase price plus in some cases the cost of transport to the plant, and in almost all cases it can be determined with all needed accuracy before the material reaches the factory.

In the case of imported goods, cost must include:

Cost of goods ex manufacturer's factory.

Packing.

F.O.B. charges, including rail and cartage, handling, etc., to ship.

Shipping charges.

Insurance—Marine, pilferage, breakage in transit.

Duty (if any).

Landing charges (including stacking on wharf).

Agents' charges.

Cartage, etc., to works.

A record should be kept in columnar form showing all these particulars of an importation, and the final column should show the unit cost landed at works. Where several importations of similar items occur, the records should be of use also for comparative purposes.

For goods purchased locally cartage in the case, say of coal, could be added, but for varied items, it is not worth while dissecting the cartage account. The invoice price then becomes the cost at the works, and cartage is charged as a sundry expense.

Cost price of worked material on the other hand must be calculated by the cost department, and hence the actual price is not available until some time after the material is completed. If a price is required almost immediately on account of the material being put into production, a tentative price could be fixed, based on the previous cost figures and adjusted subsequently.

### Inventorying

Though a perpetual stock card record gives the amount of stock on hand at any time, and test checks are advised to be made at frequent intervals, it is highly desirable that a complete physical stock-taking or inventorying be made at least once a year.

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The following points should be considered in the annual physical stocktaking:—

1. Preparatory work for the inventory.
2. Instructions to be issued.
3. Method of taking stock.
4. Method of listing items.
5. Method of pricing items.
6. Method or figuring items.
7. Method of checking items.
8. Method of proving and summarizing the inventory.

1.—In large plants it is necessary to shut down the works to enable stock to be taken. This is done usually at Christmas, when the annual holidays are granted employees.

Some time before the closing down, the place is cleaned up, scrap sent to the scrap department, and work stacked in an orderly manner, material of a like character being grouped to facilitate count or weighing.

2.—Definite instructions should be given and set out that plant equipment and tools are not to be included in the inventory. If an inventory of these is required, it should be taken separately on special forms.

3.—The method of taking inventory is dependent largely on the layout of the works, the goods manufactured and time allowed for the job. Clerical officers with a knowledge of the processes are best suited for the job, and the foreman or some similar mechanic should be in attendance.

Every item, after being weighed or counted, and entered on the sheets should be marked with paint or a distinctive tag bearing the particulars. Opportunity should be taken at this time to "root out" all obsolete material and scrap and arrange for sale.

4. Listing.—All items of similar kinds should be grouped together on separate sheets.

Raw materials, work in process, finished parts, and finished stock should all be listed separately, so that when the values are inserted a total of each may be readily ascertained.

5. Pricing.—To prove the workings of a cost system, stock should be priced at the values shown by the cost records. If prices have declined much, stock should be valued at market price, of course, and adjustments made subsequently as regards the control account for stocks. If values have appreciated stock should be priced at cost.

6.—The value of work in process is one that always causes trouble, and it is here that a good costing system will be of use.

7.—If process costing is in use prices are generally the average cost, and work in process must include its share of overhead expenses. Finished parts and finished stock prices may be had from the cost records.

8.—Calculating machines are of great use in extending the stock sheets. In some cases double columns are ruled on the inventory sheets, one column perforated, and after the calculations are made this is detached. A second clerk than extends the calculations into the

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second set of columns, which is subsequently compared with the first calculation made.

Values of stock should be reconciled with the control account in the financial ledger. Any differences of minor importance can be transferred to an adjustment account, and subsequently included in overhead charges. Any large difference requires explanation, and possibly, reference to the management.

The question of inventory values of stores boils down in the end to an estimate of forced liquidation. Theoretically anything stored is worth what you can get for it, which varies directly as the time allowed by your creditors, less the discount always expected by buyers of bankrupt stock. It is well, therefore, to insist on a conservative inventory value.

### Recording in Costs

1.—Each requisition for materials should have the job order number or process order number marked thereon.

2.—A summary of the value of stores issued each period—say, four weeks—should be made out and reconciled with the total value of requisitions posted to jobs by the cost office.

3.—Reconciliation or check should be made with the credit postings to stock cards. This is best done by setting aside daily the cards on which postings are made and summarising same at the end of the day.

Working to a scheduled output or a pre-determined output for the year, we are able to calculate with a great amount of accuracy from our records what the requirements will be for an output of 100 million pounds per annum.

Having decided upon the stocks required to purchase, contracts are generally invited some time before for the various items. Contract specifies quantity required, duration of contract, deliveries at regular intervals with definite quantities and with a specified minimum amount, quality of the goods. In the case of metals, for example, an analysis is required to which supplies must conform—size of ingots (if metals)—packing in casks, coils or on reels, delivery C.I.F., F.O.B., or at works. Price as per contract accepted or at the average price ruling for a certain period.

Where a purchase is made abroad, generally, and in fact in most cases, delivery will be F.O.B. the nearest port of shipment (it is well in ordering abroad to state definitely where the F.O.B. delivery is to be made). Metals (non-ferrous) are purchased cash against documents. A firm price may be agreed upon, but as a rule for metals supplied in Australia the price is the average weekly price (Monday-Friday, inc.) of the London market quotations according to the Australian Metal Exchange for the week the order was placed—where the contract is spread over some period the price would be the average price for the week of shipment.

The placing of an order abroad with delivery F.O.B., cash payment against documents, necessitates arranging with the bank for a letter of credit with the bank's agents in the particular country.

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Where a matter of exchange is concerned it is well to state that the rate shall be the rate ruling at the time of shipment, or in a c.i.f. transaction, when the bill is lifted.

Documents will include: Bill of lading (in duplicate), insurance note (in duplicate) with declaration and country of origin, etc.; weight certificate (certified by sworn weigher), specification note, laboratory certificate (probably), Government export permit (sometimes).

With regard to ordinary merchandise supplies—and these are what most people are concerned with—the procedure is: (1) The storeman, when he sees his stock is low, forwards to the manager a requisition for same. This sets out the article required.

Quantity.—Quantity at present on hand; purpose for which supply is required.

Storemen order for general supplies only (i.e., renewal of stocks), foremen for special jobs or supplies, and the storekeeper for all classes of goods. Requisitions are in duplicate and numbered in sequence. Office has a record of books and the numbers issued to each person authorized to order, and checks same every four weeks. If any are missing, storekeeper wants to know why.

On receipt of requisition the purchase clerk obtains quotations from firms—if no contracts exist—marks on back of requisition firms and prices, and on front in red ink best offer. Submits to manager for approval. Quotations are also recorded on cards showing item, firm, date, price, etc. Requisitions approved are then summarized on a form which shows: Firm, article required, quantity and value and total value of requisitions (also a reference to requisition number and order number). As deliveries and payments are subsequently marked against these in a special book the outstanding liabilities, quantities undelivered or completed, for orders placed can be ascertained at any time.

All requisitions from the storeman have a reference number to the stores summary and vice versa, and the latter bears the number of the order issued to each firm. If approved by manager and provided cash is available, for which the accountant certifies, orders are then made out on the firms.

Orders all numbered are made out in triplicate. Three different colours are used. These orders, signed by the accountant or other responsible official, set out the supplier's name and address, date, article ordered and quantity, and price and total value, where delivery is to be made, and department requiring the goods. Duplicate copy of same, in addition to the above, also provides space for the signature of storeman receiving the goods, and column for purchase sheet folio. Triplicate copy has similar information, and serves as an advice note to the storeman. Original, of course, goes to the supplier, duplicate and triplicate copies to storeman. On receipt of goods, storeman signs duplicate and forwards same to office. Here it is checked with order and invoice received and attached to account. Everything being certified as O.K., is then submitted for payment. Afterwards filed in numerical order.

In addition, the storeman makes out a daily purchase sheet or return of goods received. This, which is in duplicate, and numbered

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carbon copy being retained in store, shows the date received, item numbered, supplier, order number, article, quantity or weight, rate and value, and stock card folio, is signed by storeman and forwarded to the office, and when posted to card ledgers, signed also by stores clerk. For purchases returned a returns sheet somewhat similar, but in red ink, is made out. When sent to the office, prices are filled in from the firms' invoices previously checked with quotes received and extensions checked, and when everything is O.K. forms the basis for posting to the stock cards, and bound together in a folder forms the purchase ledger for posting to financial books. Invoices when received are not sent to the storeman. Storemen have no necessity to know the value of the goods, and their duty is to deal with the receipts and issues in quantity.

Stocks are kept on the perpetual inventory system. Perpetual inventories require perpetual attention—cards show on debit side name of item, stock item number, location and store, date received, order number, quantity or weight, rate and value; on the credit side date of issue, department requisition number or job number, quantity or weight, rate and value. It will be noted that no provision is here made for showing balances, either in quantity or value. Experience has shown that with stock continually moving a balance is physically seen almost daily, and if the balance of any particular item is required it can be had immediately without the necessity of keeping a running balance for hundreds of cards. Storemen know their stock and keep in touch with the storekeeper, who maintains daily supervision.

The old method of showing minimum amount for each material on the card and maintaining those reserves by a purchasing requisition from the storeman was slipshod and at best inflexible. It did not admit of ready adjustment to meet radical changes in production. The time to buy and the quantity is a matter for the buyer, not the storeman.

Stock cards are kept in alphabetical sections, before which is an indexed guide card of a different colour. This facilitates the handling of the cards, shows the number of cards in each section, and incidentally tells when any are missing. The sectionalising of raw materials and stores and finished stock enables a readier balance to be ascertained for control account purposes kept in the financial ledger. Physical test checks are maintained and sectionally controlled. If it is necessary to transfer stores from one store to another, or if the storekeeper sees that one store could conveniently do with less stocks and that another store could use, a transfer system is in vogue. Order to transfer, per storekeeper's number, is quoted on transfer. Different colours are used for each store. Transfers are made out in triplicate, first copy retained in book, duplicate copy sent with goods, triplicate copy per messenger to receiving storeman. Thus the foreman will not fail to get advice, even if the goods are delayed, etc. The second copy, when goods are received, is held by the storeman; third copy is signed and returned to the office. This third copy has then the signatures of the forwarding and receiving storeman, also the carter, and the necessary adjusting entries are made in the office as between accounts and store cards. Transfers are all numbered, a check kept on same, and reconciliation effected every four weeks.

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### Issuing

To obtain supplies from a store, printed requisitions, all numbered in sequence, are used. In addition, requisitions bear a serial number for periodical checking with cost office. Only foremen have authority to issue these requisitions, which show date, article, quantity, rate, value, stock card folio and job number chargeable to. The storeman issuing the goods signs the requisition and obtains signature from the person receiving the goods, and forwards same to office. Here the values are inserted, and posting made to the stock cards direct. After being dealt with by the stores and postings checked to cards, also values, requisitions are sent to cost office for allocation to processes and jobs. For goods returned to store from a job or process a special return stores ticket is forwarded, showing full particulars and signatures, etc.

Every four weeks cost office and stores reconcile requisitions re number and value. Stores department daily balances the value of postings to cards. The financial books which control all purchases and outgoings are sectionalized as regards raw materials, stores and finished stock, and a reconciliation effected four-weekly with stores and cost departments. Cost office balance requisitions with postings to jobs every four weeks.

In the bulk metal store, whence all non-ferrous metals are issued to the foundries, quantities are issued on a pre-determined scale fixed by the chemist, and no deviation is allowed unless the chemist stipulates in writing. Charges are weighed accurately (even to  $\frac{1}{4}$ -lb.), placed in M.S. boxes, sent to foundry on trollies. Foundryman signs for all quantities received. Metals are kept in batches, and as a record is furnished of these, there is thus a further check in addition to the storekeeper's returns.

The volatile loss and scrap for each batch of metal are known, and the result is that for every batch of metal sent to the foundry, the number of ingots to be returned, also scrap, are known and checked against the issues. The storeman signs "foundry book" for all metal received ex foundry. When the effective metal is definitely ascertained, foundry finished stock is debited and production credited. Credit is allowed the foundry for all scrap at a fixed price per pound, the volatile loss is allowed for and costs determined. Costs show value of metal treated, scrap returned, effective output, wages, crucibles, fuel, sundry stores, power and overhead charges. Scrap is used and re-used—little, if anything being lost. As the Chicago meat packer lost only the squeal of the pig, here we lose partly the volatile loss and regain portion in the shape of zinc oxide. Some of the scrap, however, is sold, and on account of the limit of scrap to be used (45 per cent.), it is necessary sometimes to dispose of good scrap. All quotes received are listed on cards, also prices received for sales of scrap and average prices of raw materials. Credit for scrap has been allowed production at a fixed rate per lb., and the scrap metal stocks (about 20 kinds are kept), debited at this price. Any difference on selling between the stock price and selling is carried to a metals adjustment account. Test checks are made with metals, in say 25-ton lots. As the heavy ingots have to be cut with a large electrically-

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driven shear, there is, of course, always a small quantity of cuttings that cannot be recovered for manufacture. These are subsequently swept up, sold, and the result amount credited to metals adjustment to affect any losses by cutting up, etc.

Test checks of stock are made at regular intervals, reconciliations made with accounts and all subsidiary departments, adjustment of metal differences made in each shipment.

For productive purposes works orders signed by the manager are issued. Each order bears a number, and contains full particulars of what is required. If necessary, drawings and specifications are provided. Reference is made also to the correspondence or order number of the firm requiring the goods.

All departmental heads interested receive a copy, likewise cost office, storekeeper and despatch department.

For maintenance work, standing orders (numbered) are in existence. Each order number bears reference to a particular division of each factory as regards either buildings or plant and machinery, thus:—

S.O. 1 Repairs and Maintenance Buildings, Packing Department,  
A Cartridge Factory.

S.O. 2 Repairs and Maintenance Buildings, Packing Department,  
A Tool, Cartridge Factory.

S.O. 3 Repairs Plant, Foundry Rolling Mills.  
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Foremen have a copy, signed by the manager of the S.O.'s concerning their department; cost office and stores have copies of all standing order numbers.

Foremen are empowered to requisition material for these jobs, using the ordinary requisition and quoting thereon the S.O. Job No.

In the tool department orders for renewal of stocks (requested by the tool storeman) are issued by the factory superintendent. Copy of same is given to tool foreman, tool inspector, tool storeman, cost office, and a copy retained by superintendent.

Tool foreman, working to practically standardized quantities, issues requisitions for steel, etc. The storeman (in this case working with the tool inspector) checks same and issues the material.

All returns of goods or spoiled work and scrap are checked back, and no finished tool is received in to store by the storeman unless accompanied with an inspection note signed by the inspector. A card history concerning each order is kept, showing person making tools, operations, number issued, rejected, accepted, with inspector's initials, as O.K.

Cost office show a complete history of a job, giving time started, ended, good tools, rejected tools, stores, labour, etc., and unit cost.

To obtain delivery of finished goods or scrap (when sold) the procedure is:—

- (1) Storekeeper issues order to deliver to storeman.

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(2) Storeman delivers goods, completes the order to deliver, which is returned to office, makes out delivery tickets in triplicate, one copy to person receiving the goods, one copy to office, one copy retained in book. Makes out also pass-out check for handling to gate-keeper.

Delivery tickets and gatekeeper's tickets are sent to office daily, checked with each other and also with order to deliver, and invoices numbered in sequence subsequently made out. Invoices bear also the number of the delivery ticket.

No finished material can leave the works without having passed stringent tests, and a certificate issued accordingly by a special inspection staff. Inspection takes place on every operation throughout the works, and records are maintained of rejected material, scrap. For tools, gauges both for use in the works and for outside purposes, an inspection note signed by the inspector (who is a qualified tool-maker) accompanies all delivery tickets.

Scrap material is returned to the store daily, and if not re-used is sold. General scrap about the place (C.I., W.I., etc), is regularly collected, and disposed of.

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## THE TREND OF PRODUCTION COSTS

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THE most important change affecting production costs at the present time is interest rates, which have advanced, both for short term and for long term loans. This increases the overhead where loans have to be secured to finance current production, or where debts have to be funded by the issue of bonds. Unless more money can be withdrawn from speculation, business may be handicapped by the shortage and output curtailed.

In April there were twelve strikes and lockouts in Canada. Four of these were carried over from March, and eight commenced, while eight were terminated, leaving four still in existence at the end of the month. Of those terminated, five were in favour of the workers, two in favour of employers, and one was a compromise. The four remaining were: Plumbers at Kingston; shipwrights, etc., at Vancouver; shoe factory workers, at Toronto; and carpenters at Montreal.

Commodity prices on the average showed a reduction in April, the Dominion Bureau of Statistics index number, calculated from 502 commodities with 1926 as the base period, decreased from 96.1 in March to 94.1 in April. Producers' goods, including materials for both manufacturing and building, went down. The most important reductions were in the following: Domestic fruits, grains, flour, eggs, cotton, wool, copper and brass, tin and solder. The only advances of importance were in livestock, hides and skins, and furs.

NEW BOOKS

## NEW BOOKS

**"Essentials of Cost Accounting."** By L. Cleveland Amidon, B.S., M.C.S., D.C.S., and Theodore Lang, A.B., M.B.A. 383 pages, \$4.50. The Ronald Press Company, 15 East 26th Street, New York.

Cost accounting seems a difficult subject to many students, and the authors of this book take the view that while this has been partly due to lack of first-hand knowledge of plant operations, it has been chiefly due to the introduction of the subject, being too abrupt, and the discussion generally being encumbered with unnecessary detail, which tended to confuse rather than to clarify.

Essentials of cost accounting accordingly endeavours to introduce the aims and methods of cost accounting gradually. After an introductory chapter, the second deals briefly with general accounting. This is not a text on general accounting, since a knowledge of that subject is assumed, it discusses to what extent costs may be ascertained from the general accounts. Chapter three goes into more detail by giving a general accounting problem, and the cost information that may be derived from it.

The general accounting procedure has three outstanding limitations. Quoting from the authors in Chapter Four, these are: "In the first place, the cost of materials and supplies consumed, the cost of goods manufactured, and the cost of sales are obtained only by resorting to physical inventories. Secondly, the only information afforded by these costs is that they constitute the total costs of production during the period. Finally, the management cannot obtain from the records the detailed analysis of the various cost elements which are so vital to it in making decisions and formulating policies."

"The cost accounting procedure," they continue, "on the other hand, provides records which overcome these limitations. In the operation of a cost system, perpetual or book inventories are established, thereby furnishing the management with timely and adequate financial statements. Unit costs of production are determined which aid the management materially in fixing selling prices and in eliminating unprofitable lines. Finally, the system lends itself favourably to a detailed analysis of the elements of plant cost—namely, material, labour, and manufacturing expense—to the end that the reduction of cost and elimination of waste in any or all of these elements are made possible."

The balance of the book accordingly deals with cost systems. At the back there are twenty-one problems related to the text, and a job order cost set. The book includes illustrations of thirty-six forms.

Following the plan of approaching the subject from the angle of general accounting knowledge, the book proceeds along lines sufficiently general to permit the student to grasp the underlying principles readily. Moreover, by using the same problem and figures to demonstrate different points in the several chapters he is enabled to learn by comparison and contrast.

## COST AND MANAGEMENT

### COST AND MANAGEMENT

OUR members will notice that "Cost and Management" is now printed in a smaller sized type. This makes it possible to print about 25 per cent. more reading matter in the same space, so that the amount of material is increased. If anyone finds the type unduly small, he is requested to write our office to that effect.

We have also added a summary of Cost Literature published elsewhere, while the list of cost studies published by our own Society, may be useful for reference.

A pamphlet giving the present by-laws of the Society, with a list of members, and a general description of its work, is being mailed to each member along with this June issue.

### EDUCATIONAL COURSE ARRANGED IN MONTREAL

THE Montreal Chapter of our Society, in conjunction with McGill University, the Chartered Institute of Secretaries and the Montreal Board of Trade, have arranged for educational courses to be conducted under the auspices of the latter.

These courses will be given in the evening with the object of providing more advanced facilities to enable young business men to qualify for more important positions in commercial and industrial life and to offer courses which will qualify students for the diploma of the Canadian Society of Cost Accountants or for the diploma of the Chartered Institute of Secretaries.

George McDonald, of the Montreal Board of Trade, pointed out that there was a great demand for commercial education, which was supplied only in part by business colleges. McGill University, on the other hand, in its faculty of commerce gave courses and set examinations for the Institute of Chartered Accountants, but there was still a demand for commercial education for secretaries, bookkeepers and business men generally. For these men at the present time there were no Montreal universities quite prepared actually to provide courses of study leading to such diplomas.

Thus, in association with McGill and the two societies, the Board of Trade had agreed to the fostering of these continuation courses pending the development of any other body better qualified to take the work over.

In dealing with the courses, the Board of Trade was following the example of the London Chamber of Commerce, which as far back as 1890 organized a department of commercial education, and the active

## EDUCATIONAL COURSE ARRANGED IN MONTREAL

organization in 1927 numbered 26,202 members with 18,925 juniors and 7,277 seniors.

The course, which will be under the control of a committee representing the Board of Trade, the Chartered Institute of Secretaries, the Canadian Society of Cost Accountants and McGill University, will be given in the evenings with the registry office in the Board of Trade and lectures undertaken by members of the staff of McGill. The first part of the line of study will lead to the intermediate examination of the Chartered Institute of Secretaries, the first examination of the Cost Accountants and a diploma to be called "the Montreal Board of Trade Diploma for Commercial Education." This part of the course will require a minimum of two years, but can be spread over a longer period.

A third year will be provided to lead to the final examination of the Chartered Institute of Secretaries and the final examination of the Society of Cost Accountants. The syllabus of the commercial course is as follows: First year, bookkeeping and manufacturing accounting; cost accounting or commercial arithmetic and mathematics of investment, or psychology; elements of commercial law and sale of goods; contracts; negotiable instruments; banking; agency and partnership, and commercial correspondence. Second year, corporation finance; secretarial practice, sale of goods; trusts and executors; company law; bankruptcy and winding up; economics or psychology (if not already taken).

The courses may be taken in two successive years or over a longer period, and when the student has passed the examination following any course he will receive a certificate to that effect. Students wishing to proceed to the examination of the Chartered Institute of Secretaries must pass or be exempted from the preliminary examination prescribed by that institute before commencing this course.

Students who have passed the intermediate examination of the Chartered Institute of Secretaries; students who have passed the first examination of the Society of Cost Accountants, and also examinations in psychology or economies and commercial correspondence, and students who have passed examinations prescribed by the committee in bookkeeping and manufacturing accounting, cost accounting or psychology, elements of commercial law and sale of goods, contracts, negotiable instruments, banking agency and partnership, and commercial correspondence, corporation finance, sale of goods, trusts and executors, company law, bankruptcy and winding up and economies of psychology, will receive the diploma for commercial education.

The third course for the final examination of the Chartered Institute of Secretaries will consist of advanced secretarial practice, conduct of meetings, commercial law, company law, banking and exchange and economies. The course in the third year for the final examination of the Society of Cost Accountants will be industrial organization and administration and advanced cost accounting.

McGill instructors will set the examinations for these continuation courses, and correct the papers and then will hand over the report to the Board of Trade.

## COST AND MANAGEMENT

### MONTREAL CHAPTER'S ANNUAL DINNER

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THIS is a rather late account of one of the biggest and most successful meetings ever held by the Canadian Society of Cost Accountants—the annual dinner of Montreal Chapter on April 11th in the Windsor Hotel. There were about 200 present, including guests representing the universities, Board of Trade, Chambre de Commerce and other business and educational bodies. G. C. Leroux, C.P.A., occupied the chair, and conducted the affair in a most pleasing style. Regret was expressed that L. A. Peto, the newly elected chairman of the Chapter, could not be present, but C. E. Whitten, the vice-chairman, ably represented him on behalf of the new executive.

The feature of the evening was the address by C. S. Walters, Commissioner of Dominion Income Tax, which address was broadcast by radio. Mr. Walters gave one of the most thorough explanations of the why and the how of income tax that has ever been heard or read in Canada. It is unfortunate that there is not a complete copy available for printing, but a summary at least can be given in one of our later issues.

Several other members and guests also spoke, the remarks of Prof. E. Montpetit drawing special applause.

With Mr. Leroux and Mr. Walters at the head table there were also: V. Gratton, F. W. Sharp, J. Hutchison, R. Campbell, T. Marchand, L. Belanger, J. Linteau, E. C. Baker, P. F. McCaffrey, James Turner, J. A. Raymond, R. Sharp, L. Favreau, John Patterson, Jean Rolland, C. E. Whitten, E. Gariepy, Professor Thompson, G. E. St. Pierre, K.C.; Colonel Bovey, Dr. Montpetit, G. C. McDonald, Henri Rolland, Prof. H. Tate, S. Godin, W. A. McKague, Col. H. Demartigny, J. I. Hobson, M. Langlois, E. Hermann, L. P. Morin, E. Reed, L. Marcoux, Col. G. S. Currie, A. G. Yon and R. J. Wilson.

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### HAMILTON CHAPTER VISITS INTERNATIONAL NICKEL PLANT

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THIS year Hamilton Chapter postponed its customary annual dinner "At Home" and a special feature was arranged in the form of a visit to the plant of the International Nickel Company at Port Colborne on May 15. The party left Hamilton after noon. The ores of the International Nickel Company are smelted at Copper Cliff, Ont., and the Port Colborne plant is for refining. The views of these operations and the courteous treatment by officials of the company were much appreciated.

The party proceeded to Welland for dinner, where they were joined by cost accountants and executives of several local concerns and by representatives of the Welland Board of Trade. S. E. LeBrock, vice-president of the society, and chairman of Montreal Chapter for the past year, presided. The main address was given by A. J. Felton, of the Alexander Hamilton Institute, and it proved a most stimulating talk, emphasizing the advantages of developing personal qualities in business. G. E. F. Smith, C.A., moved a vote of thanks.

## CONTRACTORS' COSTS

### CONTRACTORS' ACCOUNTS

**T**HE accounts of contractors and construction engineers present some peculiar and interesting problems which it might be profitable to discuss," says A. R. M. Boyle in an article on "Contractors' Accounts," printed in the "Journal of Accountancy." "Some of the projects undertaken by this class of business enterprise are of considerable magnitude. It is not uncommon for a single contract to extend over five years or more, and a payroll of from two to five thousand men is not a rarity. Such a contract assumes the proportions of a separate and complete business which would, in itself, be considered of sufficient size and importance to warrant and require the highest degree of organization and the most effective form of executive and accounting control. And, in addition to the hazards of ordinary business, there are frequently encountered engineering problems difficult to foresee, impossible to avoid and far-reaching in their consequences.

"Many of these projects are in the nature of public works. A change of government or a political campaign may place the contractor in the unenviable position of having to defend his conduct in a most searching and bitter inquiry, or the contract may be taken on a cost-plus basis, the accounts being subject to examination by the owner.

"There is, therefore, often an added necessity for a contractor to have his accounts and business records kept in such a way as to give accurate and satisfactory information in regard to his affairs."

Referring particularly to cost accounts, Mr. Boyle says:

"The all-important thing for a contractor to know is the cost per unit of the work he is doing. That knowledge is the foundation for the intelligent conduct of his business. His viewpoint is not so much that of the accountant as that of the engineer. His costs will not present the same uniformity as those of manufacturing concerns working under settled conditions. To take a simple illustration, the cost per cubic yard of excavation will fluctuate violently as the weather is fair or foul. The contractor is interested, therefore, not only in the results his cost accounts show but particularly in why these results are what they are.

"The question of contractor's costs is a technical one. Any discussion of it to be satisfactory would involve the explanation of a great amount of detail which is not within the scope of the present opportunity. Suffice it to say that the objects of a contractor's costs are:

1. To show the progress of the job from day to day or from week to week and to indicate whether the work is being carried out economically or extravagantly.
2. To indicate when, where and why and by how much costs exceed or are less than the estimate.
3. To furnish information for future estimating and to draw attention to portions of work in progress that need particular attention.

## COST AND MANAGEMENT

### COST LITERATURE

**P**ROFITS FROM WASTE. By Virgil M. Palmer, Engineer of Industrial Economy, Eastman Kodak Company, Rochester, N.Y. The Society of Industrial Engineers' Bulletin, March, 1929.

**E**arly Closing. By W. B. Knuff, the Central Alloy Steel Corporation, Massillon, Ohio. National Association of Cost Accountants' Bulletin, May 1, 1929.

**R**etail Accounting. By Charles Garties, Secretary-treasurer, the Rike-Kumler Company, Dayton, and A. E. Oxenreiter, Assistant Comptroller, Joseph Horne Company, Pittsburg. National Association of Cost Accountants' Bulletin, May 1, 1929.

**M**otor Bus and Shipping Accounting. By G. S. H. Caston, C.P.A., Gibraltar, and R. V. Winquist, General Steamship Corporation, San Francisco. National Association of Cost Accountants' Bulletin, May 15, 1929.

**I**ndustrial Organization. By Kenneth M. Sloan. The "Accountants' Magazine," May, 1929.

**S**elling and the Cost Accountant. By H. G. Jenkins, F.C.W.A. "The Cost Accountant," April, 1929.

**C**osting in the Coin-Making Industry. By T. W. Kenner, F.C.W.A. "The Cost Accountant," April, 1929.

**E**xploring the Factory and its Systems for Sources of Waste. By T. G. Rose, M.I.M.E. "The Cost Accountant," April, 1929.

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### POSITIONS AVAILABLE

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(Address replies to No. ...., Canadian Society of Cost Accountants, 81 Victoria St., Toronto.)

So many requests have recently been received for young men with a few years' experience, or with suitable education, that members and any others seeking openings in cost work are invited to file in our office a statement of their experience and qualifications and any particulars as to location and salary desired. Frequently a position has to be filled within a week or so, and "Cost and Management" therefore does not provide an opportunity for advertising it.

No. 108—Large manufacturer in Western Ontario has a senior position open in the Cost Department for a man 28-30 years of age, and who has a complete knowledge of Cost, Time and Payroll procedure. Salary commensurate with position. Send full details in first letter.

No. 109—Large Company has an opening for a recently qualified Chartered Accountant desirous of entering the commercial field. Applications will be held in strict confidence.

No. 110—Cost Accountant wanted for rubber plant in Western Ontario. Age 30 to 35 years, with experience preferably in the rubber industry. Salary about \$200 per month.

No. 111—Young man, age 20 to 25, wanted to learn cost work with paper company in an Ontario town.

